

The Conspicuous Consumption of Rhinos

BY ESMOND BRADLEY MARTIN



The rhinoceros is a powerful animal; one can tell at a glance. Unfortunately, its strength has become the cause of its demise, for people of the Middle and Far East covet virtually all its parts: In the Yemens rhino horn lends new status to age-old weaponry; in the practice of traditional Chinese medicine, the horn, the skin, the blood, even the internal organs, contribute curative properties. Within the last decade increasing demand and profiteering have accelerated the slaughter of all five African and Asian species. Where legislation has decreed rhino protection, poaching and smuggling have erupted.

Great concern in the realm of wildlife conservation prompted the World Wildlife Fund to commission Dr. Es-

mond Bradley Martin to survey the international trade in rhino products. During 1978 and '79 he traveled to the Yemen Arab Republic, Mauritius, Singapore, Hong Kong, Macao, Taiwan, Thailand, India, and Sri Lanka. He interviewed more than 100 exporters, importers, wholesalers, carvers, and pharmacists to obtain information on product uses and trading practices. In Part I of his report (February/March *Animal Kingdom*) he discussed historical and current usage of various rhino parts. Here, in the concluding installment, he examines the logistics of the trade and its controls as well as the combined effects of both factors on the precariously surviving rhino populations.

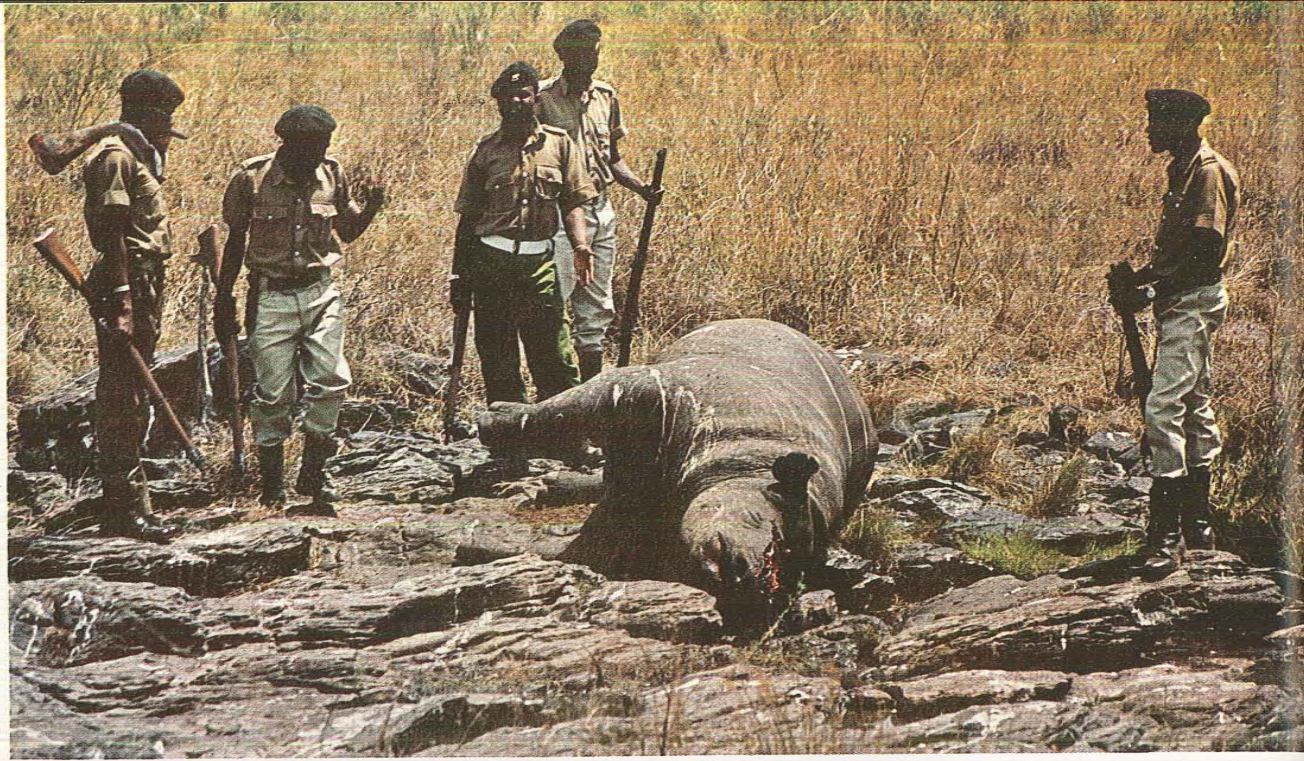
—Penny O'Prey, Executive Editor

TAIWAN IS NOTORIOUS FOR USING ANIMALS in both its cuisine and its medical preparations. In fact, one of the major attractions of its capital city, Taipei, is the animal market. Busloads of tourists take night tours to see the sights, which include Taiwanese eating dogs at the food stalls. To learn something about the animal trade in Taipei, I went late one afternoon to Snake Alley, off Hwa Hsi Street. Outside one store an eagle on a chain was perched above a carton of live Taiwanese snakes. Hundreds of bottles full of dead snakes preserved in Chinese wines lined the shelves inside. Potions from these bottles, as well as tablets made from ground snake penises (at \$28 for forty tablets), are taken by Taiwanese

men as sexual stimulants. (Houses of prostitution are close to this area.)

Farther down Snake Alley, a man on a motorcycle attempted to sell a yellow monkey from the Taiwanese mountains for \$100. He also had in tow a bear, for which he was asking \$1,050. Although passersby were intrigued by the bear and stopped to watch it for a while, the mobile entrepreneur had no customers. I cannot imagine to what use an ordinary Taiwanese, living in a small flat with a large family, would put the bear!

Not far from this spectacle an old man squatted on a street corner, surrounded by stuffed monkeys, various animal skulls, and reptiles including terrapins, in



Kenyan park rangers inspect a black rhino killed by poachers. Spurred by increasing demands and prices for rhino horn, poaching is widespread, causing perhaps half the annual average of 1,500 deaths in Kenya alone.

Taiwanese dialect he extolled the virtues of his wares to some twenty men. Across from this group several other men sat at tables in the street, where they were served snake meat, snake blood, and snake juices.

Not surprisingly, given the fascination with which the Taiwanese regard animal products and curious pets, rhino commodities are more widely available in Taipei than in any other city I visited. But while other animal derivatives often serve as aphrodisiacs, rhino horn and skin are used here for medical purposes only. The practice of traditional Chinese medicine, employing virtually all parts of the rhino, permeates Asia and has been the major reason for the rhino trade since its inception. Most of the rhino parts used in Asia come from African animals.

Rhino horn has been exported from eastern Africa for at least 2,000 years. But the beginning of its modern trade history dates back to the mid-nineteenth century, when the Sultan of Muscat moved his capital to Zanzibar island, off the coast of Tanganyika (now Tanzania). From there the sultan expanded his colonial empire to include mainland territory from Somalia in the north to Mozambique in the south. Arab and Swahili caravans traveled in great numbers to the Tanganyikan hinterland to obtain slaves and such animal products as elephant ivory, hippo teeth and rhino horn, all of which were brought back to Zanzibar for sale and export.

Zanzibar's merchants exported the rhino horns to Bombay, whence they went on to China and central Asia to be carved into ceremonial cups or used for medicinal purposes and to Muscat and Yemen to be made into sword hilts, dagger shafts, tool handles, and small tobacco boxes.

At the same time, a brisk rhino horn trade also emanated from Ethiopia. Some of these horns found their way

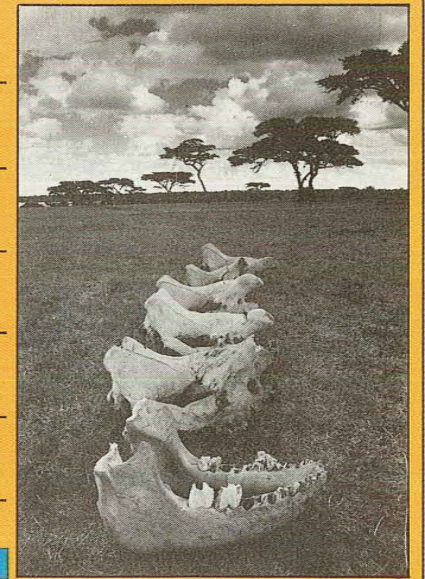
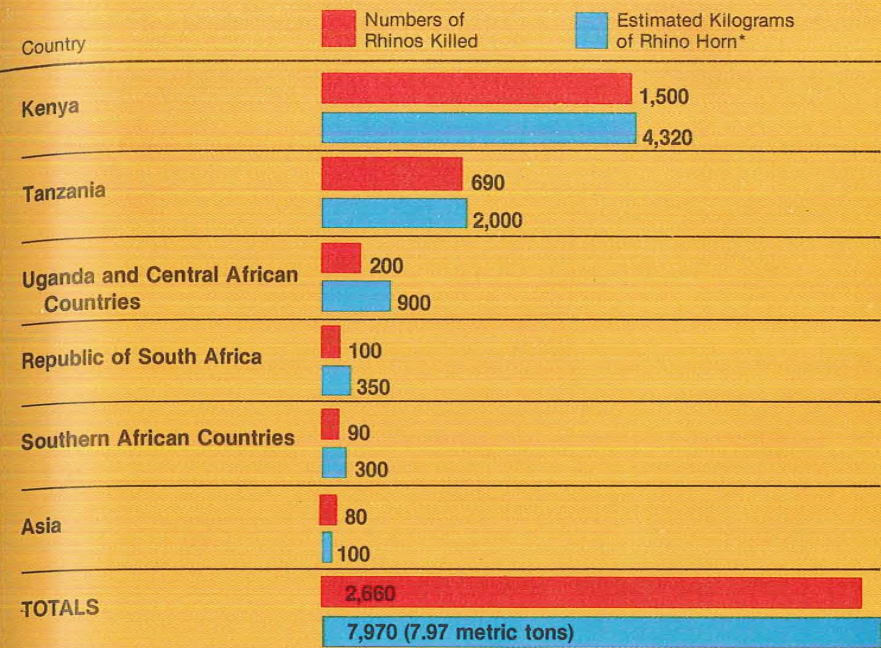
to Mogadishu, on the Somalia coast, where they were loaded onto dhows for shipment to Arabia and India. Rhino hunting was so intense in Ethiopia during the late nineteenth and early twentieth centuries that the populations were virtually exterminated; it is highly unlikely that there are more than a dozen black rhinos in that entire country today.

The slaughter in India, Siam (now Thailand), Malaya (now West Malaysia), and Borneo peaked in the late nineteenth and early twentieth centuries, and by the onset of World War I, East Africa—Kenya, Uganda, and Tanzania—had become the major supplier of rhino horn.

From 1930 to 1969 official exports from East Africa remained remarkably constant. In the 1950s and 60s the bulk of East African horn shipments went to Hong Kong, Zanzibar, Yemen, Britain, and the United States. Both Zanzibar and Hong Kong served primarily as entrepôts: Most of the horn passing through Zanzibar was shipped to Hong Kong; while Hong Kong itself reexported to China, Taiwan, South Korea, and other Asian countries. Suddenly, from 1970 to 1976, the amounts exported from East Africa more than doubled, reflecting a new demand for horn in the Yemen Arab Republic, which is now the world's greatest consumer of rhino horn.

Meanwhile, because most rhinoceros populations had been so severely depleted, many countries of origin had restricted or banned hunting the animals and trading in their products. Despite such limitations the intense demand and the rising prices led many exporters to illicit means of conducting business. Their smuggling makes it extremely difficult to estimate the true volume of horn exported yearly. Official statistics show only lawful shipments, and some Indian merchants in Mombasa have said that even

Rhinos Killed and Horn Produced—Annual Average 1972 to 1978



Rhino jaws on an African plain—remnants of a greedy slaughter

*Amounts of horn are based on the type and size of horns for rhinos native to each country or region.

from 1930 to 1970 about as much horn left Kenya illegally as did legally. Naturally, exporters of contraband neither keep copious records nor inform the world at large of their criminal activities.

But Kenya is not the only East African country that engages in large-scale illicit exports of rhino horn. Tanzania was the next most important supplier of the product in the 1970s. From IUCN's rhino group figures, I estimate that Tanzania has been exporting approximately 2,000 kilograms of horn, representing about 695 rhinos killed, annually.

The African nations of Zaire, Uganda, Central African Republic, Sudan, and Zambia have killed, together, possibly 800 rhinos a year. I do not think, however, that even half this horn reaches the market because of political instability, poor communications, and lack of awareness of the horn's commercial value.

In October 1979 a survey showed about 3,500 rhinos remaining in Zambia's Luangwa Valley and 350 to 850 in other parts of the country. Calculating from 1973's estimated population, it seems that as many as 4,500 rhinos had been killed in the intervening years. In November 1979 the Zambian government banned all rhino hunting.

Countries of southern Africa, excluding the Republic of South Africa, have supplied a minimum of 300 kilograms annually to the world market. Angola probably exported more than any other country in this group, due to its relatively large rhino population in the early 1970s. Rhodesia (now Zimbabwe) had exported horn for many years, some from its own rhinos and some from those of neighboring countries. Then in 1962 the government initiated protective measures for the imperiled white rhino, whose population is slowly increasing and now numbers about 160. In addition, from 1965 to 1975 the Rhodesian

PERSPECTIVE: Smuggling

Looking at legal export figures alone creates a distorted picture of the trade in rhino products. The phenomenal number of illicit dealings means that rhinos are being slaughtered at an even faster rate than the world is given to think.

One method of ascertaining the extent of illegal trading is to compare respective export and import figures of two trading regions for the same period. For example, from 1969 through 1976 the official export totals of East African countries show that only 6,000 kilograms were sent to the Yemens (Yemen Arab Republic and People's Democratic Republic of Yemen), while the official import figures for the Yemen Arab Republic alone show that 22,645 kilograms came in—a discrepancy of more than 16 metric tons—much of it very likely smuggled. While some of that horn may have been imported from the Sudan and southern Africa, it would have been but a small percentage of the total.

Another way to calculate the amount of horn smuggled is to compare official export statistics with the number of rhinos that died. From figures given to me by the IUCN African Rhino Specialist Group, I estimate that the rhino populations in Kenya were at least 18,000 strong in 1969; by 1979 only about 1,500 remained. Based on 2.88 kilograms of horn per animal, the 16,500 animals that died produced approximately 47,520 kilograms of horn. Nevertheless, the official Kenya export figures from 1969 through 1978 were a mere 24,335 kilograms, suggesting that nearly 50 percent of the horn was illegally traded.

—EBM



Most of these Yemen men are wearing daggers with rhino horn handles as they gather to buy meat on market day. New prosperity has created a booming demand for the horn, which is prized by Yemenis as a symbol of status.

government transferred many black rhinos to parks and wildlife estates. Poaching of this species declined in the 1970s, and the populations increased from 440 in 1971 to roughly 1,100 in 1979. But since the outbreak of civil war in 1978, poaching has once again become a serious problem and the horn is probably being smuggled out of Zimbabwe into South Africa for sale to Asian countries.

For at least the last fifteen years the country of South Africa has been a major supplier of horn to the Far East. Because of its role as a trade center, South Africa exports considerable amounts of horn originating from neighboring countries. Almost all the South African horn is sold to Hong Kong merchants, who keep about 20 percent for local wholesalers and reship the rest to dealers in Taiwan, Japan, and China. One major Hong Kong dealer has a Chinese relative with an import-export business in South Africa. This relative travels all over South Africa and Zimbabwe, buying up horn and skin to ship directly to the dealer in Hong Kong. I was unable to obtain exact import figures for the late 1970s from that dealer, but he admitted that he imported no less than 100 kilograms per year. At least three other businesses in South Africa also send rhino horn to Hong Kong.

Although white rhinos were on the brink of extinction in South Africa fifty years ago, conservation measures have helped to increase their populations and they are

legally hunted today. But there are only about 570 black rhinos in the country, and an average of one a year falls to poaching. Thus, of the horn actually originating in South Africa, most is from the white species.

As well as being a major exporter of horn, South Africa is the largest supplier of rhino skin, also from the white species. Fresh hide is extremely heavy and before it can be transported any distance it must be dried. This necessitates that the hunters either stay near the kill site for several days or bring a vehicle right up to it. For this reason skin is rarely removed from the carcasses in any country where antihunting laws are enforced. It is too risky for poachers.

Unfortunately, the status of the white rhino is not as secure as the legality of hunting in South Africa implies. There are only about 4,000 white rhinos in all of Africa. Of the black species there are no more than 20,000. Even so, well over 90 percent of the international trade in rhino products is from the white and the black species, for the simple fact that there are still ten times more rhinos in Africa than in Asia.

OF APPROXIMATELY 2,000 WILD RHINOS IN ASIA, three-fourths are the one-horned Indian species inhabiting India and Nepal. They are well protected in comparison with the black rhinos of Africa. Nevertheless, the Asian animals are poached and their horns are smuggled into the



Throughout most of Asia, horn of the great Indian rhino is preferred over all other species for use in traditional Chinese medicine. Only about 1,500 individuals remain in the wild, and poaching continues despite their protected status.

vast, lucrative trading web.

Most Nepalese believe that their king owns their country's 350 rhinos. Thus, poachers are afraid to keep horns in their possession and quickly trade their plunder across the border to merchants in India, whose major customers are South Korea, Taiwan, and Thailand. Of course there are no statistics on these illegal exports, but two of the major importing countries publish figures. In both Taiwan and Thailand, traders told me they can purchase Indian horn, but at very high prices.

Because of its vulnerability in the wild, the Sumatran rhino is being poached more than any other Asian species. Its total wild population is estimated at a mere 300. A considerable part of its range is in Thailand, and since the nineteenth century the animal has been under extreme stress from Thai poachers, with the result that in the 1950s only about fifty remained. Even after 1961 when it became illegal to hunt any rhinos in the country, poachers were hardly discouraged. Japan imported 50 and 100 kilograms of horn from Thailand in 1968 and 1969, respectively.

In the early 1970s a few local conservationists, led by Boonsong Lekagul, encouraged the government to pass a law prohibiting all trade in both Sumatran and Javan rhino products. (Most likely all the Javan rhinos in Thailand had already been exterminated; the only confirmed population of that species is on the western tip of Java.) In 1972 it

became illegal to import, export, or possess commodities of either species.

Nevertheless, the trade has continued. Now, with probably fewer than ten Sumatran rhinos left in the country, supplies come from Burma, across the frontier northwest of Chiangmai, and over the Tenasserim range west of Bangkok. Furthermore, there is no law against the sale of African or Indian rhino products. One might suspect the retail pharmacists of persuading officers of the Royal Forest Department's Wildlife Conservation Division that their stocks are foreign when in fact they are not, but in reality this does not seem necessary. The officers are busy with many other conservation activities, and pharmacies are rarely investigated. To be blunt, many conservation laws are openly flouted.

Thailand's problems are acute, and some of the seeming apathy toward law enforcement may be due to unscrupulous wholesalers who have corrupted officials by bribing them. Bangkok has about six major dealers involved in wildlife exports; all of them are rich and influential. Some have developed clever ploys to elude customs inspectors, such as prominently marking their air shipments POISONOUS SNAKES when in fact they may contain Sumatran rhino horn or other illegal commodities. They also have been known to take endangered species products to Laos, where they easily obtain documents claiming Laotian ori-

Minimum Imports of Rhino Horn Annually 1972 to 1978

Importing Country	Kilograms* Imported
Yemen Arab Republic	2,972
Taiwan	943
Japan	792
South Korea	223
China	1,750
Others (Hong Kong, † Singapore, † India, Nepal, Malaysia, Burma, Thailand, Macao, Indonesia, western Europe, the Americas)	1,000
TOTAL	7,680 (7.68 Metric Tons)

*1 kilogram = 2.2 pounds; 1 metric ton = 2,200 pounds
 † As entrepôts, Hong Kong and Singapore re-export most of what they import; this chart reflects only what they consume.

primarily responsible for the boom.

In the early 1970s thousands of Yemenis migrated to Saudi Arabia and the Persian Gulf states to earn high salaries as laborers on the massive development projects fueled by oil industry profits. Since the Yemenis are Muslim, speak Arabic, and are very hard workers, they were especially welcome by their Arab neighbors. By 1978, out of a total population of six million, almost one million Yemenis were working in Saudi Arabia, and in that year they brought home \$1.2 billion. Per capita income climbed from \$80 in 1970 to \$500 in 1979. Among the new symbols of wealth were *jambias* (the daggers worn by Yemeni men) with rhino horn handles. The rhino horn imparted status and power to the traditional weapons, and thousands of men suddenly began asking for them. Despite an increased supply, there was not enough horn available to meet the demand, and the wholesale price soared.

For the 1969 to 1977 period, about 8,500 rhino horn *jambias*—representing 1,000 rhinos killed—entered the Yemen market each year. Should the supply continue at that level, it would satisfy only 17 percent of the demand potentially created by the 50,000 teenage boys annually coming of age. Granted, not all those young men will want or be able to afford rhino horn *jambias*. But, unless immediate measures are taken to halt the horn's import into the country, the threat to remaining wild rhinos will be proportionately greater.

After the handles are made, the carvers collect all the shavings and sell them to a dealer who ships them to Hong Kong. During the 1970s Hong Kong businessmen purchased these shavings in considerable quantities. I estimate that about 20 percent of the gross imports of rhino horn into San'a end up in Asia for medicinal use; this amounts to 4.5 metric tons for the last decade.

The shavings are not ground into powder before export, for traders in the Far East would find it difficult to identify the powder as genuine rhino horn. And there is good reason to fear being swindled: One prominent Hong Kong importer of horn and ivory received from Southern Yemen a gunnysackful of cow, instead of rhino, horn shavings.

ALL THE RHINO PRODUCT WHOLESALERS in Hong Kong also import elephant ivory. They deal with agents in East Africa who have traditionally supplied them with large amounts of ivory, and it is convenient to buy the horn from the same source. During my many hours of conversation with the Hong Kong importers, it became clear that they were much more interested in their ivory dealings and were in no way experts on rhino products. They did not even know, for instance, which part of the horn was most valuable or the exact medicinal uses for it. Of all the rhino horn they handled, about 80 percent was reexported to mainland China, and their transactions had to be made with mainland agents, who drive very hard bargains. In January 1979 there were no more than twenty regular importers of rhino products in Hong Kong, while there were fifty-two major raw ivory importers.

Before 1976 there were no restrictions on the importation of rhino commodities into Hong Kong. But in August of that year, when the government introduced the Animals

and Plants Ordinance to conform with the explicit Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), dealers were theoretically required to obtain licenses to export or import, and permits to possess, any rhino products. Unfortunately, the legislation was badly written and technically covered only the Indian and Javan rhinos. The error was not rectified until June 1978 by subsequent legislation. Thereafter the director of Agriculture and Fisheries issued licenses only when convinced that the horn had come from countries legally exporting it—Tanzania, Zambia, and South Africa.

At the end of 1978 Ian Parker, in carrying out a major survey of the international ivory trade for the U.S. Fish and Wildlife Service (see *Animal Kingdom* February/March 1980), talked to the Hong Kong dealers. He explained that rhinoceroses were under severe pressure from poaching and that in the interest of conserving the remaining rhinos in the wild, they should immediately cease all trade in rhino commodities. The dealers agreed and in fact requested the director of Agriculture and Fisheries to issue no further import or export licenses for any new rhino products. The director consented in February 1979.

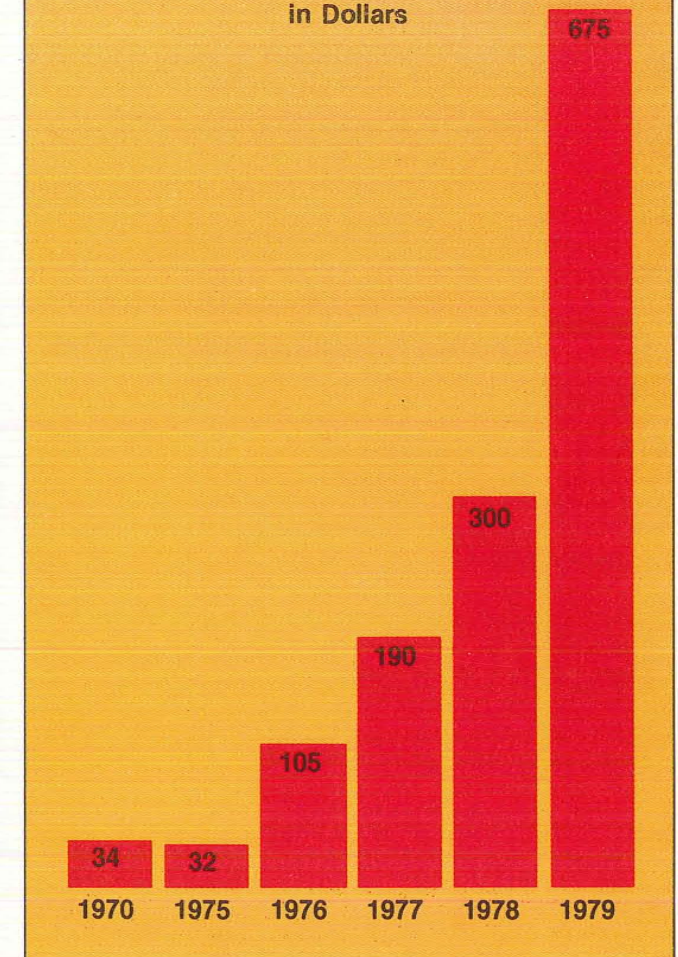
Having since interviewed many Hong Kong government officers and dealers as well as importers in neighboring countries, I am convinced that there was very little smuggling after the ban, although horn and skin are still traded within Hong Kong. Moreover, I believe that because the dealers themselves initiated the action against international trade, the success of the law is much greater than it could have been had the government acted independently. If dealers in other countries would follow this example, the Asian pharmacists would have to use substitutes—probably saiga antelope horns, if not modern remedies—for fever-reducing drugs.

As a result of the ban in Hong Kong, Singapore may well become the most important center for the rhino-product business in Southeast Asia. There are no restrictions on this country's animal trade, nor is there any conservation body actively protesting the sale of products from endangered species. The government has shown no interest in signing CITES and apparently condones large-scale trafficking in animals.

In Macao, a small Portuguese territory with a population of only 260,000, the wholesalers are also the pharmacists. They formerly used both Hong Kong and mainland China as sources of supply for rhino products, but told me that because of prices and Hong Kong's ban, they expected to buy all their rhino products from China in the future. Should China ratify the CITES agreement, it is probable that Macao pharmacists will turn to Singapore to satisfy their demand for African rhino horn and skin.

CHINA'S INFLUENCE IN THE USE OF ANIMAL DRUGS is well known throughout Asia, and the country is a major producer of rhino-based tablets and tonics for foreign as well as domestic consumption. Although, due to Western influence, there had been a decline in the popularity of traditional Chinese medicine in the late nineteenth century, under Mao's regime in the mid-1950s revival of the use of traditional drugs was strongly encouraged.

Median Wholesale Prices per Kilogram of African Rhino Horn in Dollars



charts by Jim O'Connell

gin, then return them to Bangkok declared "in transit" for overseas destinations like Belgium.

Thailand is responsive to international pleas, as the following anecdote illustrates. A restaurant in Bangkok advertised the availability of tiger penis soup, yet the authorities did nothing about it until several months later, when some conservationists from an internationally known organization visited Bangkok. They went to the restaurant and verified that, although the concoction was not written on the menu, it was indeed offered by the waiters. The conservationists approached the Wildlife Conservation Division, and the restaurant owner was immediately arrested.

It is unlikely that more than 100 kilograms of fresh Asian horn was traded annually through the 1970s. A greater quantity has been circulated in the trade, but it is old horn, formerly kept as trophies and recently thrust into the market because of the growing demand and prices.

RHINOCEROS HORN PRICES increased gradually from the turn of the century through 1975. Then the wholesale value of African horn skyrocketed. Within a year it more than tripled, and by September 1979 the minimum wholesale price had multiplied by more than twenty times to an astonishing \$675 per kilogram. The opening up of the new market in the Yemen Arab Republic, or North Yemen, was

East African export statistics show that by the early 1970s the People's Republic of China had become an extremely important purchaser of rhino horn; in recent years China has been the major consumer of rhino horn shavings from the Yemens. I believe the shavings are generally used in low-cost drugs for the treatment of common ailments. The prices of such tonics and tablets can be kept low because their rhino horn content is small in proportion to other components.

Taiwan imports great quantities of the tablets as well as processed rhino skin. Every medicine shop I entered there had an abundance of rhino products, quite in keeping with the Taiwanese propensity toward animal usage. While visiting Taipei's infamous Snake Alley to learn about the country's bizarre animal trade, my interpreter and I joined a throng of men listening to a store proprietor. With a microphone around his neck, a knife in one hand, and a wriggling snake in the other, the man cut open the snake and drained its blood into a glass. He added some wine, then removed the snake's gall bladder and mixed it with the blood and wine. After he harangued the crowd for fifteen minutes about the value of his snake tonic, one customer finally stepped forward, paid \$2.25, and quickly swallowed the concoction.

On my way out of Snake Alley I witnessed the gruesome dismemberment of a tortoise before a large crowd of people

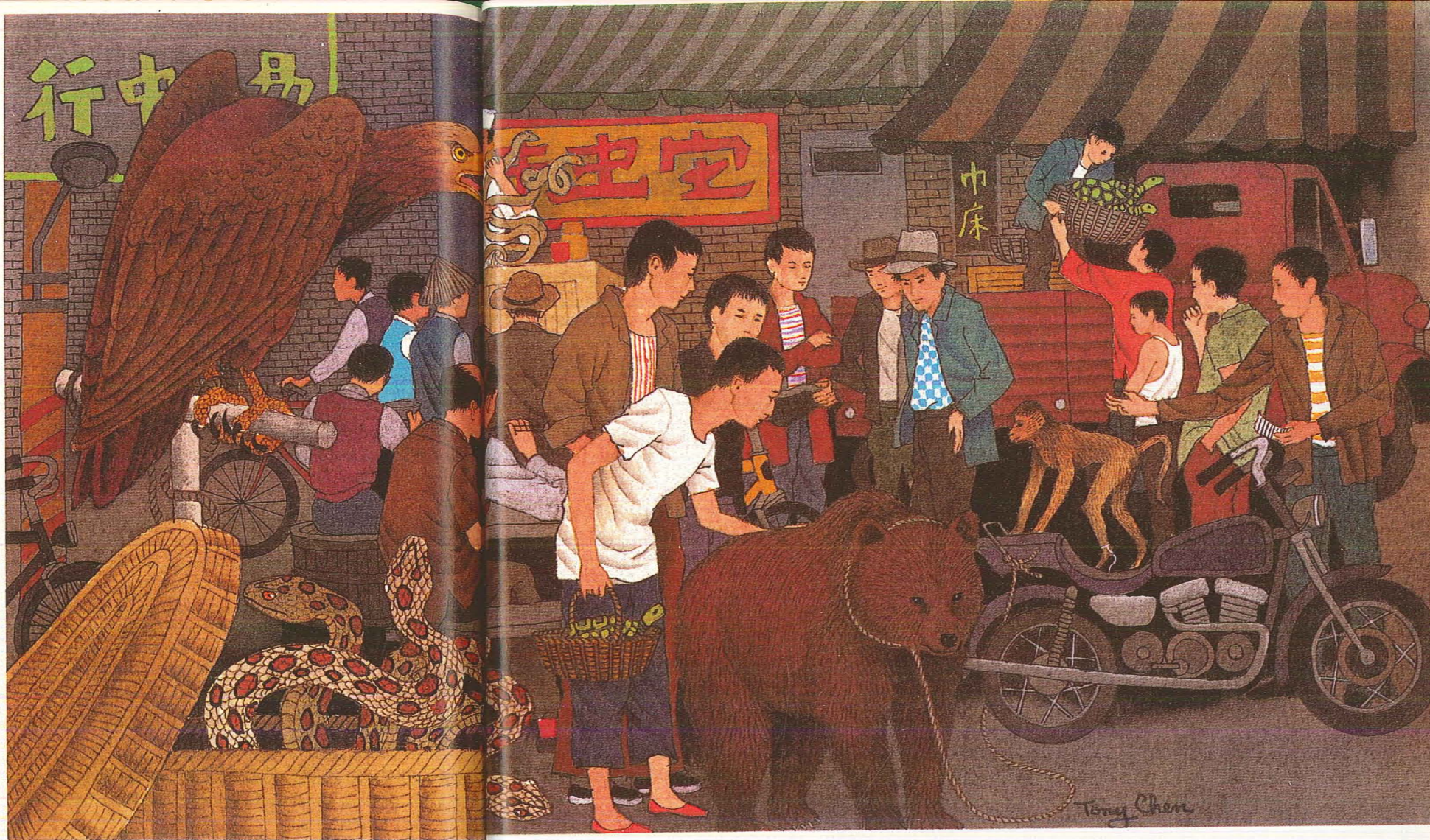
who seemed more interested in a women's wrestling match on the color television set just inside the merchant's shop. At the end of the performance with the tortoise, the merchant was unable to sell the meat and retreated to the back of his shop to disperse the remains among his employees. Despite the variety of activity I witnessed, afternoon is the slack time of day in Snake Alley. At night business is very brisk, and the whole area is packed with men coming to consume aphrodisiacs on their way to patronize the ladies of the evening.

The wholesale rhino-product business for all of Taiwan is centered in Taipei. Many of the shops are dingy, noisy, and polluted. Gunnysacks, barrels, boxes, and other containers of various items clutter the stores, and it is difficult to approach the sales counters in most of them. Sometimes, clouds of dust fill the air as several electric machines grind roots and twigs for packaged medical preparations. In the back of such a shop there are usually a table and a few chairs where the owner and his employees gather to sip tea and play cards or Mah-Jongg. However, they spend most of their time sorting out the pharmaceuticals, and processing and packaging them for sale to retailers. There is nothing elegant or romantic about this occupation, and the employees put in long hours of tedious work.

Taipei's retail medicine shops stand in stark contrast to the wholesale outlets: They are the most modern and elaborate of any I saw in Asia. Air-conditioning, color televisions, comfortable chairs, pleasing tea sets for the customers' use, and decorative displays of traditional medicines are the rule. Many of these shops also have adjoining consultation rooms which resemble fashionable salons.

One shop in particular struck me. At its entrance there was a Mandarin-speaking parrot in a cage on a stand. Three rhino horns were displayed in the shop window and two other large ones were on view inside. On one wall, above an impressive array of expensively packaged Korean ginseng, was a framed letter of appreciation to the proprietor for his extensive sales of this product. The consultation room was elegant: Large nineteenth-century Chinese armchairs with marble-inlaid backs were grouped beside twin couches with maroon cushions; in the center several intricately carved stools surrounded a table; on the wall opposite the doorway hung the mounted head of a large black rhino (horns still intact), flanked on the left by an antelope head and on the right by that of a deer. Business was very good at this establishment, but, to my disappointment, the owner was unwilling to discuss his rhino horn sales in much detail, possibly because he was aware of the recent ban on imports in Hong Kong.

That ban may make it difficult for Taiwanese dealers to meet future demands for rhino products. One wholesaler told me, however, that there are at least 1,000 kilograms of rhino horn privately held in Taiwan and that much of this will very likely come onto the local market. Although the Taiwanese wholesalers have no direct connections with dealers in the East African countries, they may try to buy more from South Africa. Taiwan has not signed CITES, and the rhino dealers felt sure in late 1979 that their trade would continue, one way or another.



Snake Alley's animal market is a major attraction in Taiwan's capital city, Taipei. One can buy there everything from live eagles, monkeys, and bears, to preserved

animal parts that serve as aphrodisiacs. Customers sit at tables in the street to consume "invigorating" concoctions of meat and juices from freshly killed snakes. Not surprisingly, the author found rhino products more widely available in Taipei than in any other city he visited.

ON A WORLDWIDE BASIS the rhino trade uses a quantity of close to eight metric tons of horn—equivalent to the death of about 2,580 animals—each year. There is no way the wild rhinoceros populations can support this volume. Continued killing at this rate would mean that in ten years there would be none left in the wild. The brunt of the pressure falls on the black rhino in Africa and the Sumatran rhino in Asia. The bleakness of their future is compounded by warfare as well as by agriculturists and ranchers encroaching on their habitats; this will lead to further splitting of the wild populations into small, unstable units not conducive to breeding. Assistance for these two species is urgently needed.

Conservation measures can help, as the case of the white rhino in South Africa has proved. Additional national parks, more patrols, and an active tourist program have helped the Indian rhino in northern India and in Nepal. Even though, in Asia, Indian rhino horn commands seven times more money than that of the black rhino, the

species is better off than it was.

Of all the rhinos, the black is by far the most widely distributed, but its populations are being subjected to such stress that their breeding habits are being impaired. Only in very small areas of the parks in southern Africa has there been any natural increase in rhino populations during the past ten years.

Of the Sumatran species, only two strong breeding groups are known today: One is in the Gunung Leuser Reserve in northern Sumatra, with about fifty individuals; the other resides in Endau-Rompin in West Malaysia, with fifteen. These areas also have suitable space and vegetation to accommodate more animals, but additional reserves are needed to ensure the species' survival.

For the Javan rhino, with only fifty animals—all in one reserve—the outlook is precarious. Natural hazard, disease, poaching, and other risks could wreak havoc on any single population unit. Another breeding nucleus of Javan rhinos in an entirely separate area should be established.

In taking an active role in the protection of the remaining rhinos, conservation bodies must insist that better use be made of manpower and vehicles patrolling protected breeding ranges. One cannot expect poaching to decrease when there are no trained or motivated men to safeguard these animals and their habitats. In addition, those conservation laws already in existence must be tightened up and rigorously enforced. It is only in conjunction with conservation measures that trade in rhino products can be stopped, and this trade must cease if any insurance is to be given for the survival of the remaining numbers of rhinos. □

Dr. Martin, an American geographer and consultant to the IUCN's African elephant and rhino specialist groups, spent the better part of two years surveying the trade in ivory and rhino products. He recently returned to his home in Nairobi from a follow-up study in the Far East. This is the conclusion of a two-part article.